JC772 U.S. PTO
10/16/00

BIRCH, STEWART, KOLASCH & BIRCH, LLP

INTELLECTUAL PROPERTY LAW
8110 GATEHOUSE ROAD
SUITE 500 EAST
FALLS CHURCH, VA 22042-1210
U S A
(703) 205-8000

FAX: (703) 205-8050
(703) 698-8590 (G IV)

e-mail: mailroom@bskb.com
web: http://www.bskb.com

CALIFORNIA OFFICE:
COSTA MESA, CALIFORNIA

TERRELL C. BIRCH
RAYMOND C. STEWART
JOSEPH A. KOLASCH
JAMES M. SLATTERY
BERNARD L. SWEENEY*
MICHAEL K. MUTTER
CHARLES GORENSTEIN
GERALD M. MURPHY, JR
LEONARD R. SVENSSON
TERRY L. CLARK
ANDREW D. MEIKLE
MARC S. WEINER
JOE McKINNEY MUNCY
ROBERT J. KENNEY
DONALD J. DALEY
JOHN W. BAILEY
JOHN A. CASTELLANO, III
GARY D. YACURA

OF COUNSEL:
HERBERT M. BIRCH (1905-1996)
ELLIOT A. GOLDBERG*
WILLIAM L. GATES*
EDWARD H. VALANCE
RUPERT J. BRADY (RET.)*
F. PRINCE BUTLER
FRED S. WHISENHUNT

*ADMITTED TO A BAR OTHER THAN VA.

THOMAS S. AUCHTERLONIE
JAMES T. ELLER, JR.
SCOTT L. LOWE
MARK J. NUELL, Ph.D.
D. RICHARD ANDERSON
PAUL C. LEWIS
MARK W. MILSTEAD*
RICHARD J. GALLAGHER
JAYNE M. SAYDAH*

REG. PATENT AGENTS:
FREDERICK R. HANDREN
MARYANNE ARMSTRONG, Ph.D.
MAKI HATSUMI
MIKE S. RYU
CRAIG A. McROBBIE
GARTH M. DAHLEN, Ph.D.
LAURA C. LUTZ
ROBERT E. GOOZNER, Ph.D.
HYUNG N. SOHN
MATTHEW J. LATTIG
ALAN PEDERSEN-GILES
C. KEITH MONTGOMERY
TIMOTHY R. WYCKOFF
KRISTI L. RUPERT, Ph.D.
LARRY J. HUME
ALBERT LEE
HRAYR A. SAYADIAN, Ph.D.

JC915 U.S. PTO
09/688241
10/16/00

Date: October 16, 2000
Docket No.: 2950-0174P

Assistant Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): KIM, Byung J.
YOO, Jea Y.; SEO, Kang S.

For: METHOD FOR RECORDING STREAM SPECIFIC INFORMATION IN A DISK AND PROVIDING THE RECORDED INFORMATION

Enclosed are:

X A specification consisting of 15 pages

X 6 sheet(s) of formal drawings

X An assignment of the invention

X Certified copy of Priority Document(s)

X Executed Declaration X Original ___ Photocopy

___ A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27

___ Preliminary Amendment

___ Information Disclosure Statement, PTO-1449 and reference(s)

___ Other _____

The filing fee has been calculated as shown below:

			LARGE ENTITY			SMALL ENTITY	
FOR	NO. FILED	NO. EXTRA	RATE	FEE		RATE	FEE
BASIC FEE	********** ********** **********	********** ********** **********	***** ***** *****	$710.00	or	**** **** ****	$355.00
TOTAL CLAIMS	19 - 20 =	0	x18 =$	0.00	or	x 9 = $	0.00
INDEPENDENT	3 - 3 =	0	x80 =$	0.00	or	x 40 = $	0.00
MULTIPLE DEPENDENT CLAIM PRESENTED no			+270 = $	0.00	or	+135 = $	0.00
			TOTAL $	710.00		TOTAL $	0.00

Express Mail Label No. EV 339 100 625 US

_X_ A check in the amount of $ 750.00 to cover the filing fee and recording fee (if applicable) is enclosed.

___ Please charge Deposit Account No. 02-2448 in the amount of $_____. A triplicate copy of this transmittal form is enclosed.

___ No fee is enclosed.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____

JOSEPH A. KOLASCH
Reg. No. 22,463
P. O. Box 747
Falls Church, Virginia 22040-0747

(703) 205-8000
JAK/amr

METHOD FOR RECORDING STREAM SPECIFIC INFORMATION IN A DISK AND PROVIDING THE RECORDED INFORMATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an optical disk and method for recording program or stream specific information (PSI or SSI) for recorded data stream in an optical disk such as a high-density digital versatile disk (HD-DVD) and providing the recorded PSI or SSI to a presenting device such as a digital television.

2. Description of the Related Art

A digital television which can receive digital broadcast programs and present them as high-quality picture and sound is being popularized. The digital broadcast signal to be processed in the digital television contains PSI for various programs and data presentation control as well as digital video and audio signal. It is specified that the PSI should be intermittently inserted in the data stream of the digital broadcast signal.

Therefore, the digital television interprets the PSI received intermittently, and selects a program contained in the

data stream and decodes data belonging to the selected program based on the PSI interpretation.

In the meantime, a disk device which is being developed to reproduce a high-density digital versatile disk (HD-DVD) whose recording standard is under discussion, is expected to be connected with a digital television as shown FIG. 1 through IEEE 1394 standard. The digital television 500 still requires PSI to select a program and to control data presentation when receiving and presenting the data stream from the disk device 100.

Therefore, when reproducing MPEG-formatted data stream recorded in a HD-DVD and sends it to the digital television 500 connected through a digital interface such as IEEE 1394 standard, the disk device 100 should provide PSI, which consists of a program association table (PAT), a program map table (PMT), a conditional access table (CAT), and so on as shown in FIG.2, to the digital television 500 in the format of a transport stream (TS) consisting of 188-byte-long transport packets (TPs).

To provide PSI for recorded data stream to the digital television, which is connected through a digital interface such as IEEE 1394 standard, intermittently and periodically as in a digital broadcast signal, it may be considered that PSI is recorded dispersedly and repeatedly in a data recording area 'AREA 1' of a HD-DVD as shown in FIG. 3, and it is retrieved and transmitted sequentially along with data stream.

However, if PSI is recorded dispersedly and repeatedly in a data recording area of a disk, the recording area for real data, that is, video and/or audio data is greatly reduced, which causes to decrease a recording efficiency of a disk.

In addition, the digital television should wait for receiving one in regular sequence among the PSI recorded dispersedly in the data recording area to present received data stream even though data receiving has been resumed after a

reproduction point is moved according to a key command of a user or the digital interface such as IEEE 1394 standard is reset. Since the digital television can not select data stream to decode into real picture and/or sound until the PSI for the data stream is received, there is inevitably discontinuity in video and/or audio or blank screen for a while.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an optical disk containing PSI in its management recording area and a method for recording PSI in an optical disk and providing the recorded PSI to a digital television, which records PSI for the recorded data stream in a specific area where management information for the recorded real data is written and, if it is time to send PSI, searches and reads PSI written in the specific area to a digital television.

A method of recording stream specific information along with data stream in a disk according to the present invention, checks whether stream specific information requires to be changed while recording the data stream in the disk, generates stream specific information adequate to the data stream being recorded based on the checked result, and writes the generated stream specific information and an additional information, which consists of start and/or end position data of a related stream object, to link the stream specific information with a stream object.

A method of providing data stream and stream specific information recorded in a disk according to the present invention, determines whether it is the time to send stream specific information, obtains stream specific information related with a stream object being reproduced or to be reproduced based on the determination result, and transmits the obtained stream specific information,. wherein the stream

objects have different contents of stream specific information each other.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention, illustrate the preferred embodiments of the invention, and together with the description, serve to explain the principles of the present invention.

In the drawings:

FIG. 1 shows a digital television and a high-density disk reproducing device which are connected each other;

FIG. 2 shows partial contents of program specific information;

FIG. 3 shows partitioned recording areas and contents to be recorded thereon;

FIG. 4 is a block diagram of a disk device to which a data stream recording method according to the present invention is applied;

FIG. 5 shows partitioned recording areas and contents to be recorded thereon according to the present invention;

FIG. 6 is a block diagram of a disk device to which a data stream reproducing method according to the present invention is applied;

FIG. 7 shows a flow diagram of method for providing stream specific information according to the present invention; and

FIG. 8 shows an example of when to transmit stream specific information

DETAILED DESCRIPTION OF THE PREFFERRED EMBODIMENTS

In order that the invention may be fully understood, preferred embodiments thereof will now be described with

reference to the accompanying drawings.

FIG. 4 is a partial block diagram of a disk device, which a PSI-recording method according to the present invention is applied to, for recording data in a high density disk.

The disk device of FIG. 4 comprises a PSI separator 21 separating PSI contained in the received broadcast signal; a signal processor 22 processing the received digital broadcast signal, which the PSI is separated from, into a digital stream adequate to recording format; a PSI processor 23 processing the separated PSI into a digital stream adequate to recording format; a signal selector 24 selecting one among the broadcast digital stream and the PSI stream; a pickup 27 writing the stream selected by the signal selector 24 in a high-density disk 28; a microcomputer 25 controlling the overall recording operation; and a memory 26 for storing data necessary for control operation of the microcomputer 25.

The recording operation of the disk device 200 configured as above is described in detail.

The PSI separator 21 detects PSI, which consists of PAT, PMT, CAT, and so on as explained above referring to FIG. 2, contained intermittently in digital broadcast signal, and separates it from the received digital broadcast signal. The PSI processor 23 processes the separated PSI into a digital stream adequate to recording format of a high-density rewritable digital versatile disk (HD-DVD RAM), and the microcomputer 25 compares the separated PSI with PSI detected before to know whether the separated PSI is new, that is, the separated PSI contains data which is different from the data of the previous PSI. If the separated PSI is new, it is written in the high-density disk 28 under control of the microcomputer 25 after being processed by the PSI processor 23.

When the PSI is processed by the PSI processor 23, control information may be appended to the PSI or the PSI is modified

for various presentation appropriate to a data stream reproduced from a disk device. The modified PSI or control information appended PSI is called stream specific information (SSI).

The recording area where the PSI is written is a management information recording area where navigation data is written. The navigation data is used for controlling reproduction and presentation of recorded broadcast data containing video and/or audio data stream processed by the signal processor 22. When writing PSI (or SSI), the microcomputer 25 generates linking information between the written PSI (or SSI) and a stream object, and appends the generated linking information to the written PSI (or SSI). A stream object corresponds to a single program or a digital stream recorded from recording start to stop, and the linking information consists of start and end time of each stream object.

All of PSI (or SSI) including the linking information for stream objects, each stream object having different specific information for its own data stream, is written in the management information recording area.

In the meantime, the high-density disk 28 has two partitioned recording areas 'AREA 1' and 'AREA 2' as shown in FIG. 5, the one 'AREA 1' being for real data such as video and/or audio data which is grouped by stream object, the other 'AREA 2' being for management information such as navigation data which is used for controlling reproduction and presentation of recorded stream objects. As explained above, the detected PSI, which will be transmitted to a digital television connected through a digital interface such as IEEE 1394 to select a data stream from the disk device and to decode the selected stream, is also written in the management information recording area 'AREA 2'.

Since PSI (or SSI) is written in the management

information recording area 'AREA 2', the storage capacity of the data recording area 'AREA 1' is not reduced.

From now on, a method of reproducing data stream and specific information from the disk having PSI (or SSI) written only in the management information recording area 'AREA 2' and providing them to a digital television will be described.

FIG. 6 is a block diagram of a disk device to conduct the method of reproducing and providing data stream and specific information according to the present invention.

The disk device 300 shown in FIG. 6 comprises an optical pickup 32 detecting recorded signals of a high-density disk 31 having PSI (or SSI) written in the area 'AREA 2'; an analog signal processor 33 processing the electrical signal from the pickup 32 to convert it into a binary signal; a digital signal processor 34 processing the binary signal to obtain real data and PSI (or SSI); a TS multiplexer 35 multiplexing the real data and PSI (or SSI) and converting the multiplexed data into TS; an interfacing unit 36 transmitting the TS to a digital television 500 connected through IEEE 1394 standard; a microcomputer 37 supervising the overall reproduction operation; and a memory 36 for storing data necessary for control operation of the microcomputer 37.

The microcomputer 37 conducts an operation to provide PSI (or SSI), which is corresponding to the present data stream being reproduced to be reproduced, to the digital television 500. To do so, it reads from the management information recording area 'AREA 2' when a key command directly from a user is entered, a packet command from the digital television 500 connected through IEEE 1394 standard is received, or there occurs a bus reset on the IEEE 1394. Then, the digital television 500 interprets the PSI (or SSI) received through the IEEE 1394 bus, and selects and decodes a data stream based on the interpretation of the PSI (or SSI).

FIG. 7 is a flow diagram of sending PSI (or SSI) to a digital television according to the present invention. The PSI (or SSI) sending procedure to be conducted by the disk device 300 is described in detail referring to FIG. 7.

If the disk 31 having PSI (or SSI) written in the management information recording area is inserted onto a tray (not figured) of the disk device 300 (S10), the microcomputer 37 moves the pickup 32 to the management information recording area 'AREA 2' to read navigation data and PSI (or SSI), and stores them in the memory 38 (S11).

After that, the microcomputer 37 monitors (S12) the operation mode of the disk device 300 and the digital television 500 connected through IEEE 1394 standard as well as whether there occurs a bus reset on the digital interface of IEEE 1394. If the operation mode of the disk device 300 is reproduction mode (S13) in which a data stream recorded in the disk is or to be reproduced and transmitted in the form of TS, the microcomputer 37 checks whether a transmission operation of TS is first (S14), if then, it searches the memory 38 for PSI (or SSI) corresponding to a stream object to be reproduced based on the linking information appended to all of PSI (or SSI) and applies the adequate PSI (or SSI) to the TS multiplexer 35 along with real data stream reproduced from the data recording area 'AREA 1' of the disk 31.

The TS multiplexer 35 multiplexes the PSI (or SSI) and real data stream while converting them into TS consisting of stream information packets (SIPs) and data packets, and transmits the converted TS to the connected digital television 500 through the interfacing unit 36.

The SIP may be transmitted more than once to prevent from accident loss in communication channel before sending real data packets, and it may contain time reference information such as program clock reference (PCR) to be used to synchronize an

internal clock beforehand for timing control of data presentation in the digital television 500.

The SIP may be 188-byte long as specified for a transport packet (TP) in digital broadcast standard, and it may be transmitted repeatedly every 40 msec as shown in FIG. 8.

If a data stream of new program starts to be transmitted, that is, new stream object starts to be reproduced (S15) while a data stream being reproduced from the high-density disk 31 is being transmitted in the format of TS, the microcomputer 37 also searches the memory 38 for PSI (or SSI) corresponding to the new stream object to be reproduced and applies the adequate PSI (or SSI) to the TS multiplexer 35 along with real data stream belonging to the new stream object which is reproduced from the data recording area 'AREA 1' of the disk 31.

For example, If the start position information of the (N+1)-th stream object is detected after the N-th stream object is completely reproduced as shown in FIG. 8 while reproducing the disk 31, the microcomputer 37 reads the PSI (or SSI) related with the (N+1)-th stream object from the memory 38 and then applies the read PSI (or SSI) to the TS multiplexer 35. In other words, the microcomputer 37 searches for PSI (or SSI) related with each stream object being provided to the digital television 500 at present based on the linking information and applies the found PSI (or SSI) to the TS multiplexer 35.

Therefore, the TS multiplexer 35 multiplexes the PSI (or SSI) and real data stream of the present stream object (S20) while converting them into TS consisting of stream information packets and data packets, and transmits the converted TS to the connected digital television 500 through the interfacing unit 36 (S21).

And, if the microcomputer 37 conducts a long jump of the pickup 32 according to a key input from a user (S16), it searches the memory 38 for PSI (or SSI) corresponding to the new or same

stream object to be reproduced after the long jump, and applies the adequate PSI (or SSI) to the TS multiplexer 35 along with real data stream belonging to the stream object to which the pickup 32 is moved.

Then, the TS multiplexer 35 multiplexes the PSI (or SSI) and real data stream while converting them into TS consisting of stream information packets and data packets (S20), and transmits the converted TS to the connected digital television 500 through the interfacing unit 36 (S21).

And, if the digital television 500 connected with the disk device 300 through the IEEE 1394 standard is turned on (S17) or its viewing channel is changed (S18), a corresponding command is sent to the microprocessor 37 of the disk device 300 through the digital interface. At this time, the microcomputer 37 reads PSI (or SSI) related with stream object being or to be provided on request of disk reproduction to the digital television 500, and applies the adequate PSI (or SSI) to the TS multiplexer 35 along with real data stream, if it is in a reproducing mode at present.

Then, as explained above, the TS multiplexer 35 multiplexes the PSI (or SSI) and real data stream, if it is applied, while converting them into TS consisting of stream information packets and data packets (S20), and transmits the converted TS to the connected digital television 500 through the interfacing unit 36 (S21).

Furthermore, if there occurs a reset on the IEEE 1394 digital interface (S19), the microcomputer 37 detects the reset while monitoring the status of the digital interfacing bus, reads again PSI (or SSI) related with stream object being or to be provided to the digital television 500, and applies the adequate PSI (or SSI) to the TS multiplexer 35 along with real data stream, if it is in a reproducing mode at present.

Then, the TS multiplexer 35 multiplexes the PSI (or SSI)

and real data stream, if it is applied, while converting them into TS consisting of stream information packets and data packets (S20), and transmits the converted TS to the connected digital television 500 through the interfacing unit 36 (S21).

The above-explained operations (S12 to S22) is conducted by the microcomputer 37 until the disk device 300 is turned off or is requested to stop.

To be brief, whenever there is a command from a user or the digital television 500 connected through IEEE 1394, or there occurs a reset on the interface bus, the disk device 300 reads the stored PSI (or SSI), which was reproduced beforehand from the management information recording area 'AREA 2' of the high-density disk 31, and then provides the read PSI (or SSI) to the connected digital television 500, so that the digital television 500 can select and decode the data stream from the disk device 300 immediately after the interpretation of the PSI (or SSI) is done.

The method of providing specific information on a data stream according to the present invention can maintain the disk storage capacity for real video and/or audio data by recording stream specific information in a management recording area of a high-density disk, and provide the stream specific information to a digital television promptly when it is necessary, thereby reducing time of blank screen or discontinuity in video and/or audio presentation.

The invention may be embodied in other specific forms without departing from the sprit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed is:

1. A method of recording stream specific information along with data stream in a disk, comprising the steps of:

(a) checking whether stream specific information requires to be changed while recording the data stream in the disk;

(b) generating stream specific information adequate to the data stream being recorded based on the checked result; and

(c) writing the generated stream specific information and an additional information linking the stream specific information with a stream object.

2. The method set forth in claim 1, wherein the additional information consists of start and/or end position data of a related stream object.

3. The method set forth in claim 1, wherein the stream specific information is written in same packetized format that the data stream is written in.

4. The method set forth in claim 1, wherein the data stream is grouped into a single stream object if it is determined that the stream specific information require to be changed.

5. The method set forth in claim 1, wherein the stream specific information is written in a management information recording area where presentation control information of data stream is to be written.

6. A method of providing data stream and stream specific information recorded in a disk, comprising the steps of:

(a) determining whether it is the time to send stream specific information;

(b) obtaining stream specific information related with a stream object being reproduced or to be reproduced based on the determination result; and

(c) transmitting the obtained stream specific information.

7. The method set forth in claim 6, wherein the stream objects have different contents of stream specific information each other.

8. The method set forth in claim 6, wherein said step (b) searches for stream specific information corresponding to a stream object based on an additional information appended to each stream specific information, the additional information having data to link stream specific information with a stream object.

9. The method set forth in claim 8, wherein the additional information has start and/or end position data of a related stream object.

10. The method set forth in claim 6, wherein the stream specific information has been written in a management information recording area where presentation control information of data stream has been written.

11. The method set forth in claim 6, wherein said step (a) determines that it is the time to send the stream specific information when a current reproduction position on the disk is moved.

12. The method set forth in claim 6, wherein said step (a) determines that it is the time to send the stream specific information when a connected device receiving reproduced data stream is turned on.

13. The method set forth in claim 6, wherein said step (a) determines that it is the time to send the stream specific information when data stream belonging to a new stream object starts to be reproduced.

14. The method set forth in claim 6, wherein said step (a) determines that it is the time to send the stream specific information when a digital bus connected to a device receiving reproduced data stream is reset.

15. The method set forth in claim 6, wherein said step

(a) determines that it is the time to send the stream specific information when the viewing channel of the connected device receiving reproduced data stream is changed.

16. The method set forth in claim 6, wherein said step (c) transmits the obtained stream specific information more than once before sending reproduced real video and/or audio data stream.

17. The method set forth in claim 6, wherein data packets delivering the stream specific information contains time reference information to be used for data presentation timing in a connected device receiving reproduced data stream.

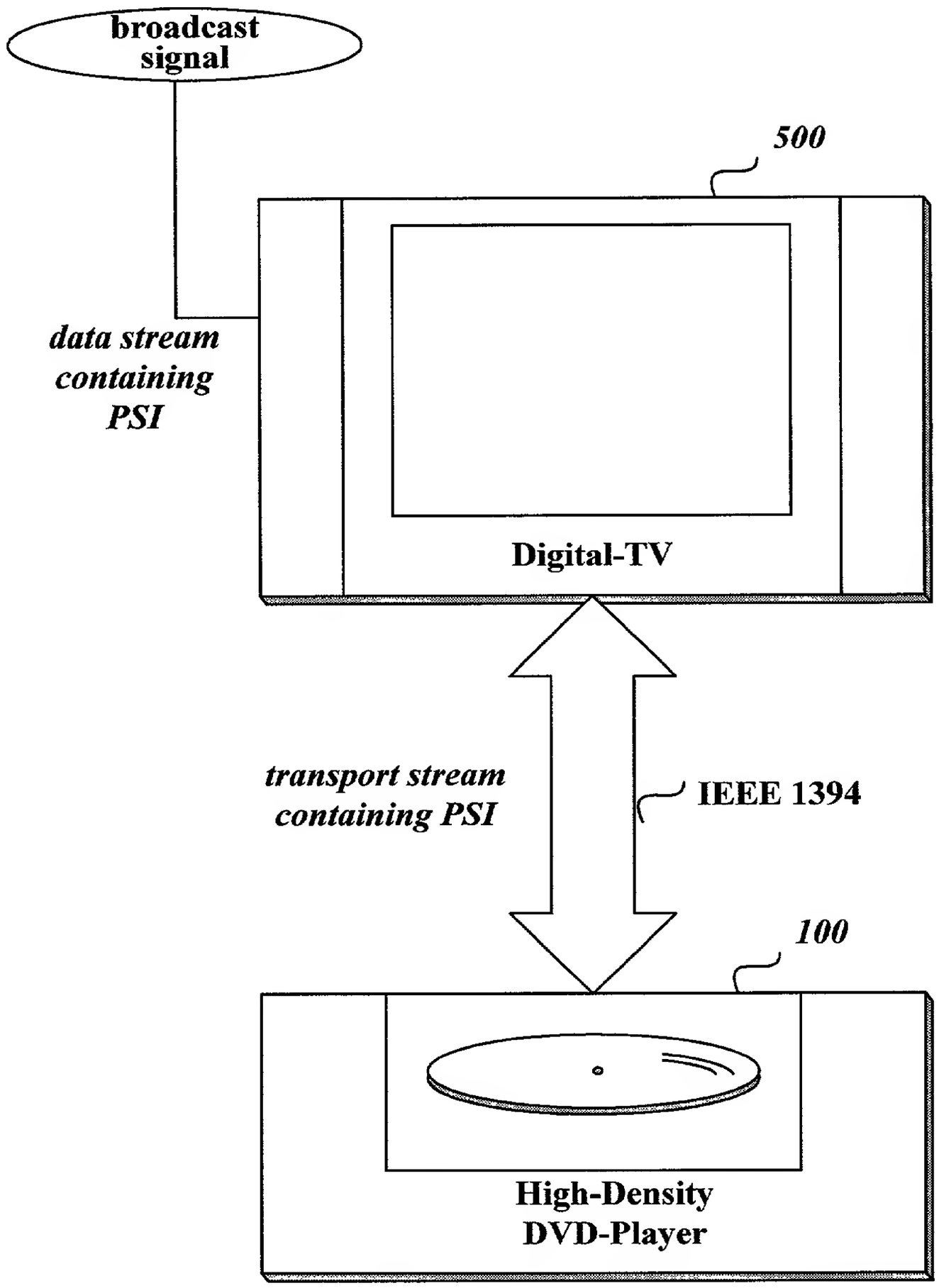
18. A disk device comprising divided recording areas, one being a data area where digital stream of video and/or audio data is written, the other being a management information area where stream specific information and management data for controlling the reproduction and presentation of the data written in said data area are written, wherein the stream specific information is associated with each stream object which is grouping unit of the written digital stream.

19. A disk device set forth in claim 18, wherein the stream specific information is associated with each stream object by linking information appended to each stream specific information, the linking information being indicative of start and/or end position of an associated stream object.

ABSTRACT OF DISCLOSURE

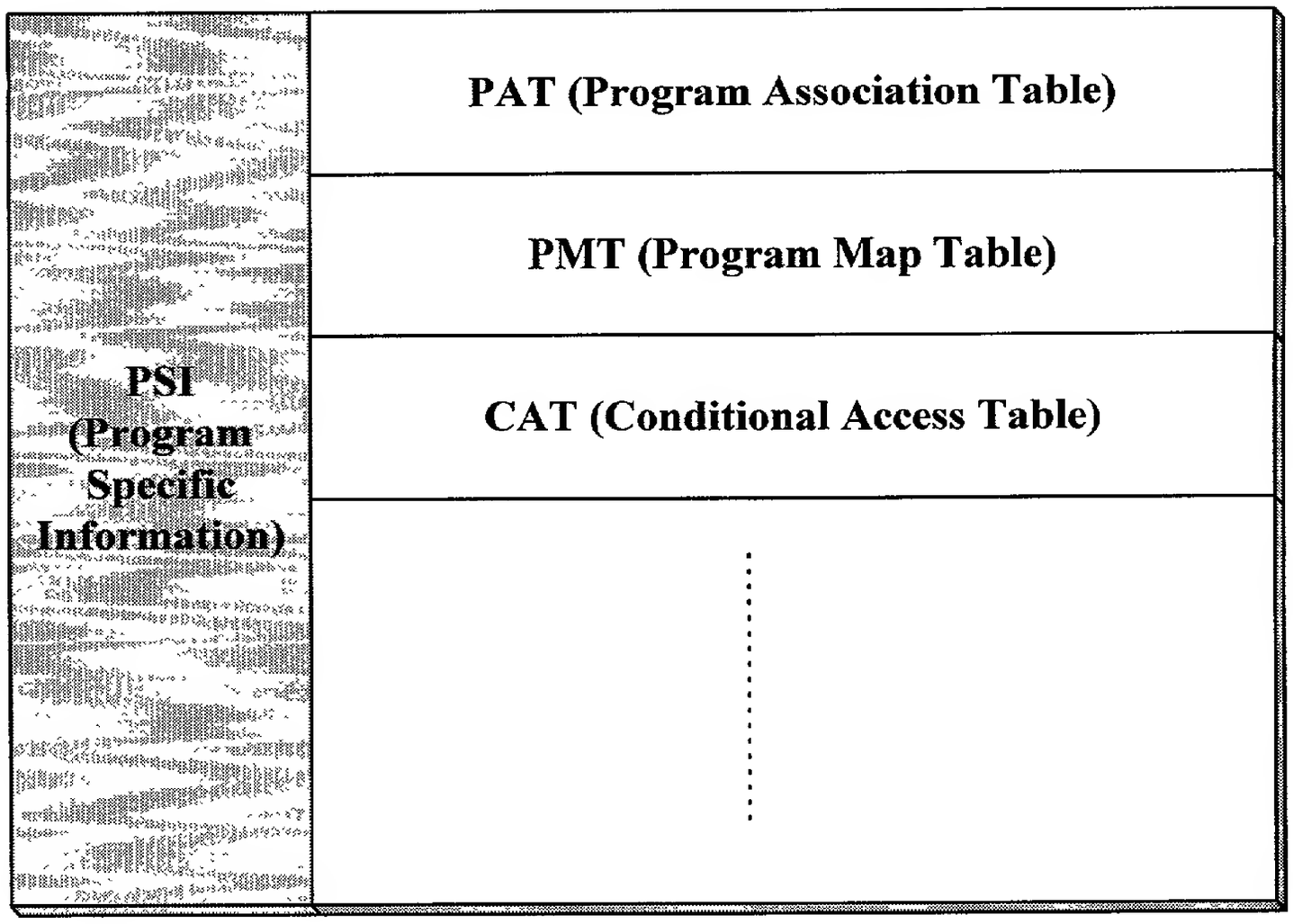
The present invention relates to method for recording program specific information (PSI) for recorded data stream in an optical disk such as a high-density digital versatile disk (HD-DVD) and providing the recorded PSI to a presenting device such as a digital television. This method writes program or stream specific information in a management data recording area of a high-density disk, and, when the recorded data stream is reproduced, determines whether it is the time to send the stream specific information, obtains stream specific information related with a stream object being or to be reproduced based on the determination result, and transmits the obtained stream specific information. This method can maintain the disk storage capacity for real video and/or audio data by recording stream specific information in a management recording area of a high-density disk, and provide the stream specific information to a digital television promptly when it is necessary, thereby reducing time of blank screen or discontinuity in video and/or audio presentation.

FIG. 1



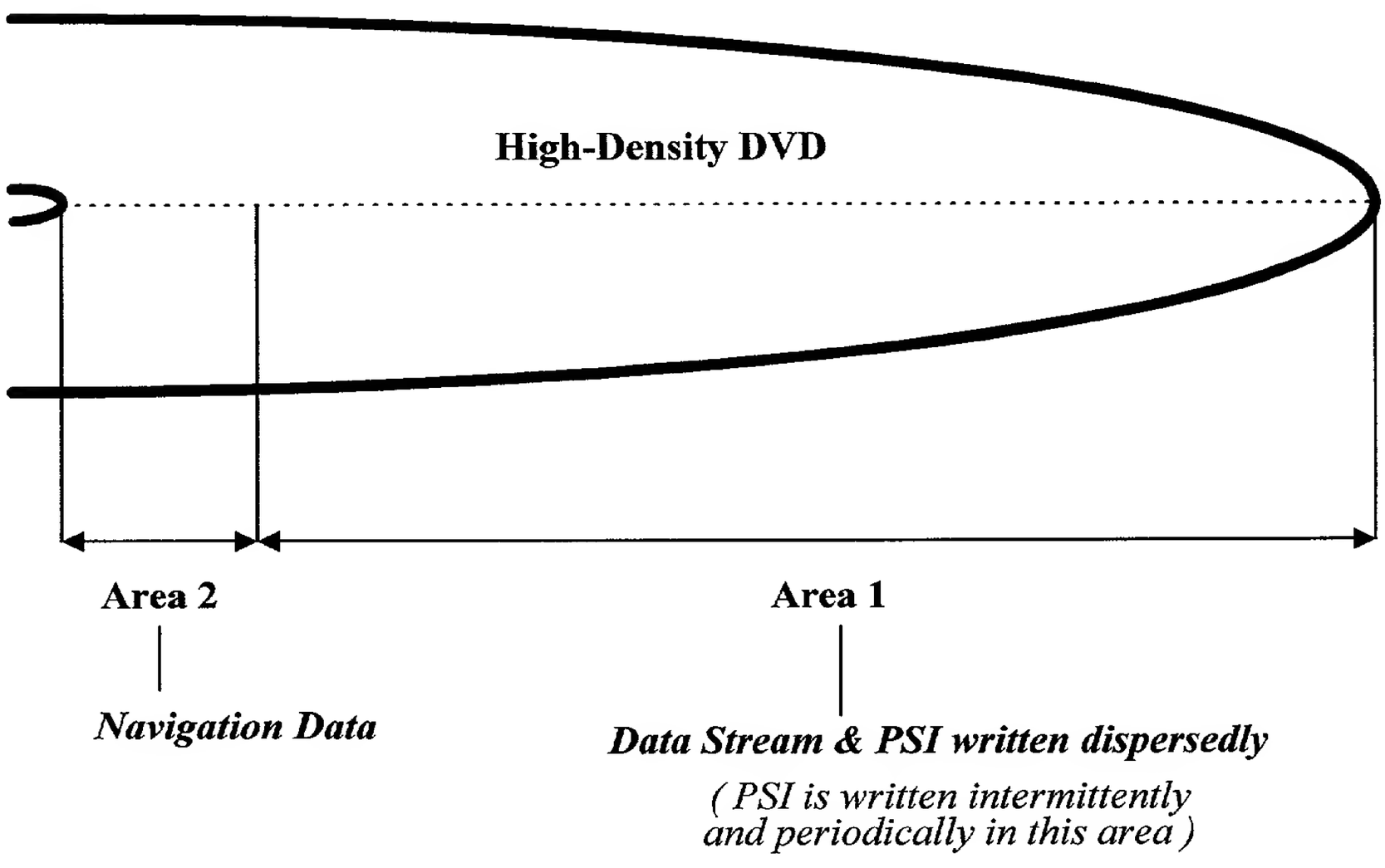
Conventional Art

FIG. 2



Conventional Art

FIG. 3



Conventional Art

FIG. 4

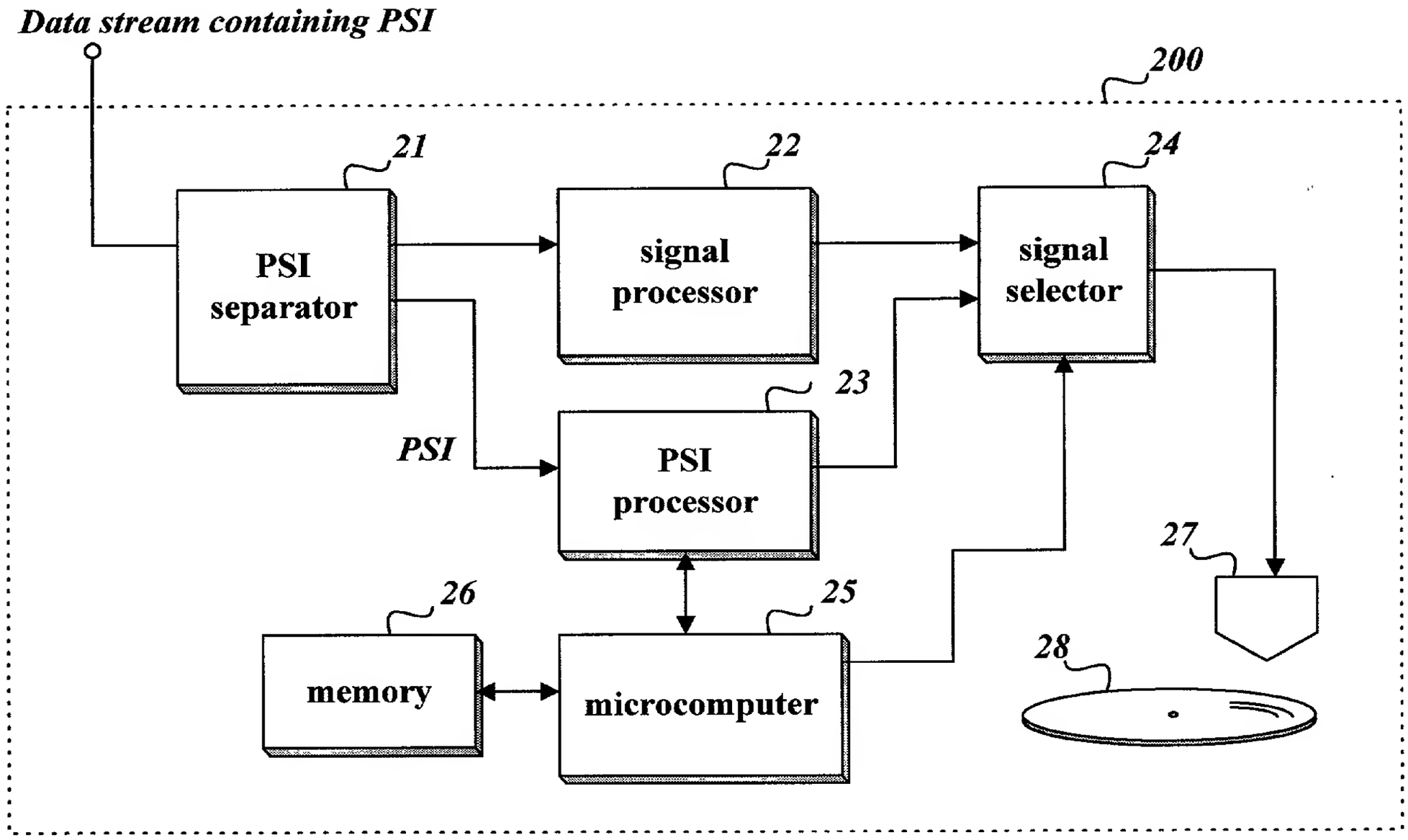

Data stream containing PSI
200
21
22
24
PSI separator
signal processor
signal selector
23
PSI
PSI processor
27
26
25
memory
microcomputer
28

FIG. 5

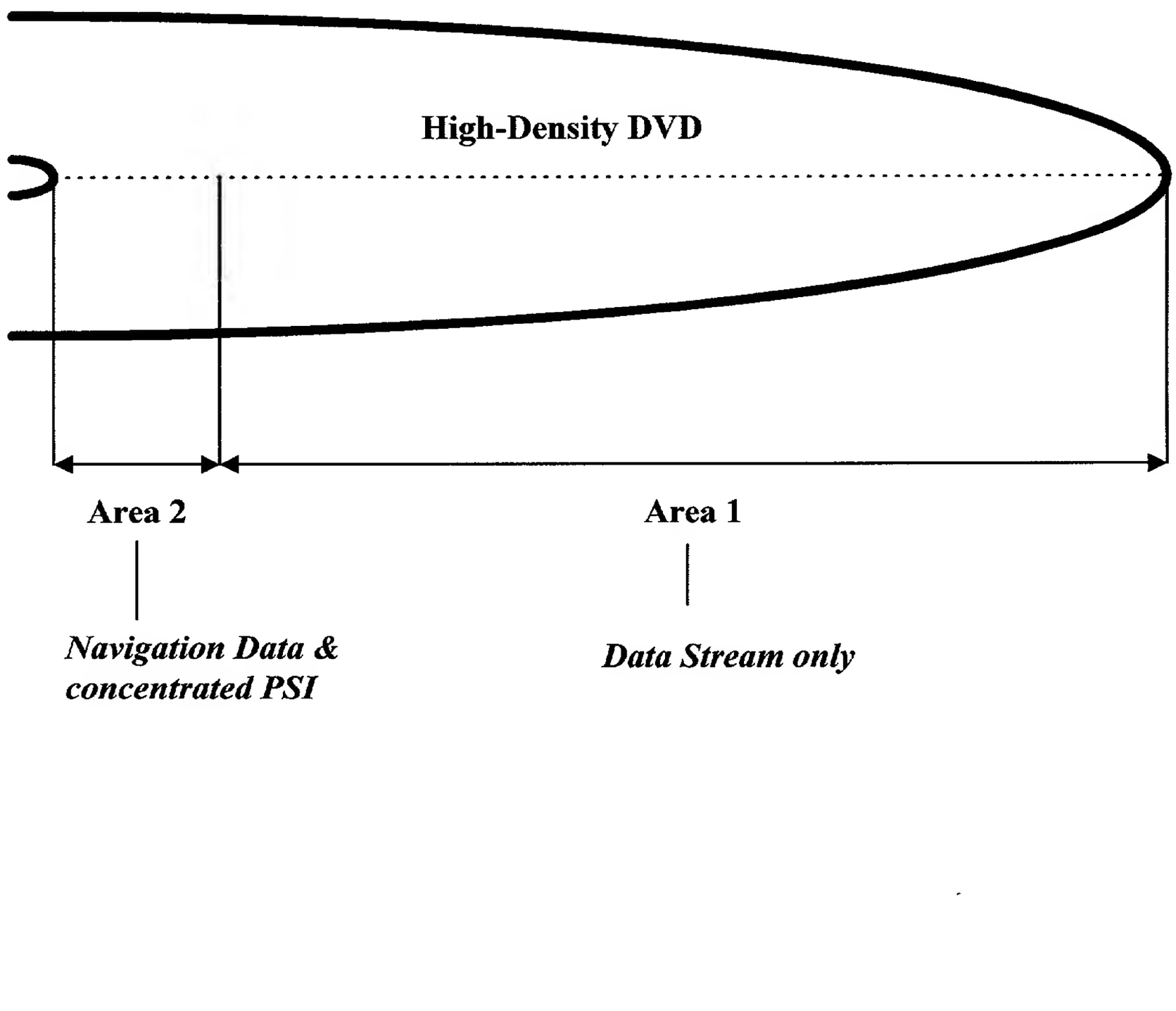

High-Density DVD
Area 2
Area 1
Navigation Data & concentrated PSI
Data Stream only

FIG. 6

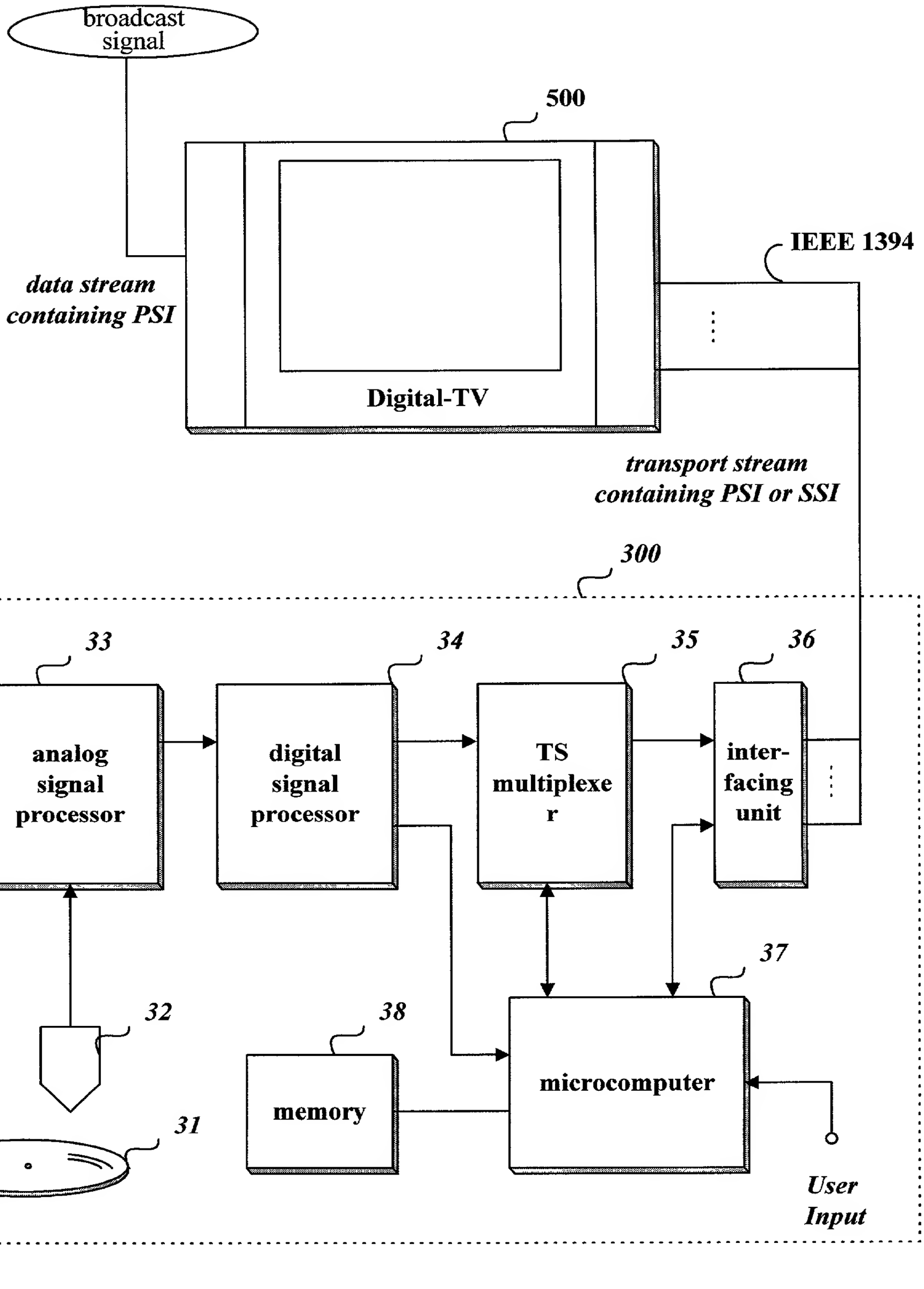

broadcast signal
500
IEEE 1394
data stream containing PSI
Digital-TV
transport stream containing PSI or SSI
300
33
34
35
36
analog signal processor
digital signal processor
TS multiplexe r
inter- facing unit
37
32
38
memory
microcomputer
31
User Input

FIG. 7

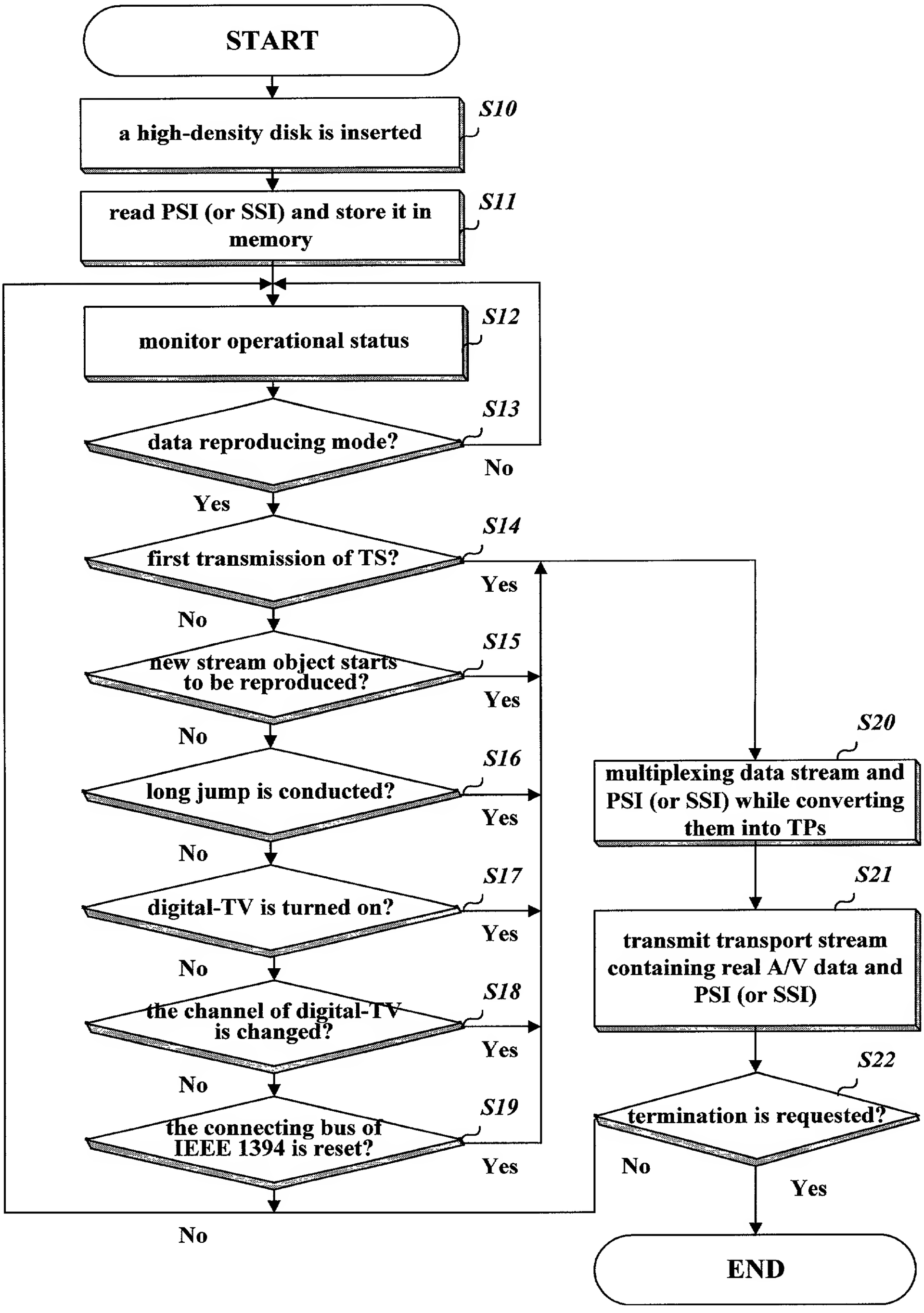
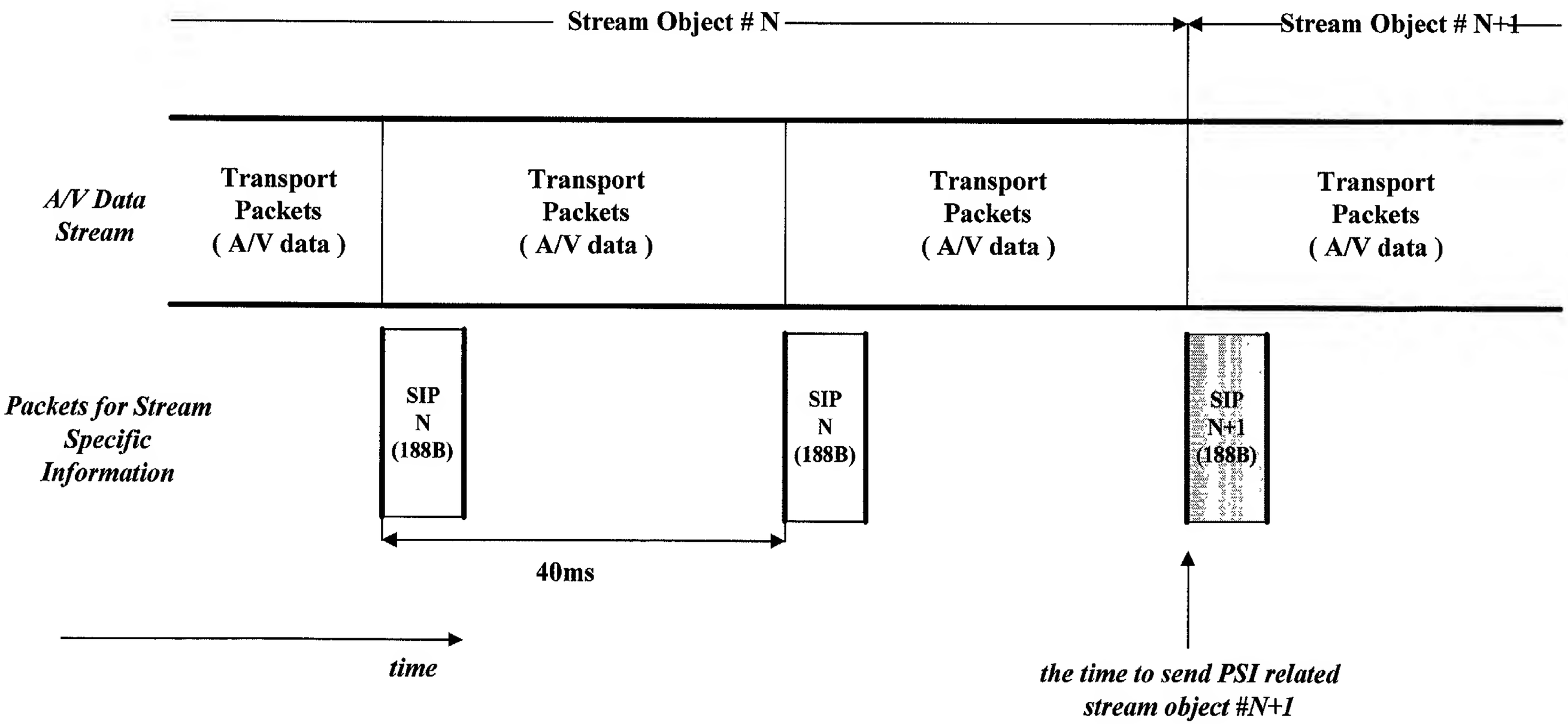

START
a high-density disk is inserted
S10
read PSI (or SSI) and store it in memory
S11
monitor operational status
S12
data reproducing mode?
S13
No
Yes
first transmission of TS?
S14
Yes
No
new stream object starts to be reproduced?
S15
Yes
No
long jump is conducted?
S16
Yes
No
digital-TV is turned on?
S17
Yes
No
the channel of digital-TV is changed?
S18
Yes
No
the connecting bus of IEEE 1394 is reset?
S19
Yes
No
multiplexing data stream and PSI (or SSI) while converting them into TPs
S20
transmit transport stream containing real A/V data and PSI (or SSI)
S21
termination is requested?
S22
No
Yes
END

FIG. 8


Stream Object # N
Stream Object # N+1
A/V Data Stream
Transport Packets (A/V data)
Transport Packets (A/V data)
Transport Packets (A/V data)
Transport Packets (A/V data)
Packets for Stream Specific Information
SIP N (188B)
SIP N (188B)
SIP N+1 (188B)
40ms
time
the time to send PSI related stream object #N+1

Attorney Docket No. 2950-174P

BIRCH, STEWART, KOLASCH & BIRCH, LLP

P.O. Box 747 • Falls Church, Virginia 22040-0747
Telephone: (703) 205-8000 • Facsimile: (703) 205-8050

PLEASE NOTE: YOU MUST COMPLETE THE FOLLOWING

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title: METHOD FOR RECORDING STREAM SPECIFIC INFORMATION IN A DISK AND PROVIDING THE RECORDED INFORMATION

Fill in Appropriate Information - For Use Without Specification Attached:

the specification of which is attached hereto. If not attached hereto,
the specification was filed on _____ as
United States Application Number _____;
and amended on _____ (if applicable) and/or
the specification was filed on _____ as PCT
International Application Number _____; and was
amended under PCT Article 19 on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Insert Priority Information: (if appropriate)

Prior Foreign Application(s)			Priority Claimed	
99-47610 (Number)	Korea (Country)	(10/29/99) (Month/Day/Year Filed)	☒ Yes	☐ No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	☐ Yes	☐ No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	☐ Yes	☐ No
_____ (Number)	_____ (Country)	_____ (Month/Day/Year Filed)	☐ Yes	☐ No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional applications(s) listed below.

Insert Provisional Application(s): (if any)

_____ (Application Number) _____ (Filing Date)

_____ (Application Number) _____ (Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Insert Requested Information: (if appropriate)

Country	Application Number	Date of Filing (Month/Day/Year)
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Insert Prior U.S Application(s): (if any)

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
_____	_____	_____
_____	_____	_____

Attorney Docket No.
2950-174P

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

Raymond C. Stewart	(Reg. No. 21,066)	Terrell C. Birch	(Reg. No. 19,382)
Joseph A. Kolasch	(Reg. No. 22,463)	James M. Slattery	(Reg. No. 28,380)
Bernard L. Sweeney	(Reg. No. 24,448)	Michael K. Mutter	(Reg. No. 29,680)
Charles Gorenstein	(Reg. No. 29,271)	Gerald M. Murphy, Jr.	(Reg. No. 28,977)
Leonard R. Svensson	(Reg. No. 30,330)	Terry L. Clark	(Reg. No. 32,644)
Andrew D. Meikle	(Reg. No. 32,868)	Marc S. Weiner	(Reg. No. 32,181)
Joe McKinney Muncy	(Reg. No. 32,334)	Donald J. Daley	(Reg. No. 34,313)
John W. Bailey	(Reg. No. 32,881)	John A. Castellano	(Reg. No. 35,094)
Gary D. Yacura	(Reg. No. 35,416)		

Send Correspondence to:

BIRCH, STEWART, KOLASCH & BIRCH, LLP or **Customer No. 2292**
P.O. Box 747 • Falls Church, Virginia 22040-0747
Telephone: (703) 205-8000 • Facsimile: (703) 205-8050

PLEASE NOTE: YOU MUST COMPLETE THE FOLLOWING: ↓

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or Sole Inventor. Insert Name of Inventor → Insert Date This Document is Signed

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
BYUNG-JIN KIM		Oct. 9, 2000
Residence (City, State & Country)		CITIZENSHIP
Kyunggi-do, Korea		Republic of Korea
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		
111-204, Hansol Cheongu Apt., 110, Jeongja-dong, Bundang-gu, Seongnam, Kyunggi-do, 463-914, Korea		

Insert Residence Insert Citizenship → Insert Post Office Address →

Full Name of Second Inventor, if any see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
KANG-SOO SEO		Oct. 9, 2000
Residence (City, State & Country)		CITIZENSHIP
Kyunggi-do, Korea		Republic of Korea
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		
606-503, Chowon Hanyang Apt., 897-5, Pyungan-dong, Dongan-gu, Anyang, 431-747, Korea		

Full Name of Third Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Jea-Yong Yoo		Oct. 9, 2000
Residence (City, State & Country)		CITIZENSHIP
Seoul, Korea		Republic of Korea
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		
C-306, Maebong Sansung Apt., Dogok-dong, Kangnam-gu, Seoul, 135-272, Korea		

Full Name of Fourth Inventor, if any see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		

Full Name of Fifth Inventor, if any see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP
POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		

*DATE OF SIGNATURE